Patent Claims

1. Process for the homogeneous heating of semi-transparent and/or transparent glass articles and/or glass-ceramic materials with the aid of infrared radiation, whereby the glass articles and/or glass-ceramic materials are subjected to a heat treatment in the range from 20°C to 1705°C. characterized in that the heating is achieved by a component of infrared radiation acting directly on the glass articles and or the glass-ceramic materials as well as a component of infrared radiation acting indirectly on the glass articles and/or glass-ceramic materials, in which the component of the radiation acting indirectly on the glass and/or the glass-ceramic materials amounts to more than 50% of the total radiation output.

2. Process according to claim 1, characterized in that the infrared radiation is a shortwave infrared radiation with a color temperature higher than 1500 K, especially preferably higher than 2000 K, quite preferably higher than 2400 K, especially higher than 2700 K, especially preferably higher than 3000 K.

3. Process according to one of claims 1 or 2, characterized in that the infrared radiation acting indirectly on the glass articles and/or the glass-ceramic material comprises a share of reflected and/or scattered radiation.

4. Process according to one of claims 1 to 3, characterized in that on the average more than 50% of the total radiation output of shortwave infrared radiation given off by the IR radiators is not absorbed in the once-through (einmaligen) impinging on the glass.

5. Process according to one of claims 1 to 4, characterized in that the process is carried out in a circumscribed

space with walls, base and cover, especially an IR radiation hollow space.

6. Process according to claim 5, characterized in that the reflected and/or scattered infrared radiation is reflected and/or scattered by at least a part of the wall, base and/or cover surfaces.
7. Process according to claim 6, characterized in that the component of the infrared radiation reflected and/or scattered from the part of the wall, base and/or cover surfaces amounts to more than 50% of the radiation striking these surfaces.
8. Process according to claim 6, characterized in that the share of the infrared radiation reflected and/or scattered from the part of the wall, base and/or cover surfaces amounts to more than 90% or 95%, especially more than 98%.
9. Process according to one of claims 8 to 8, characterized in that the infrared radiation acting indirectly on the glass articles and/or glass-ceramic material comprises a component of infrared radiation that is absorbed by a carrier body, converted into heat and given off to the glass and/or glass-ceramic material thermally joined with the carrier body.
10. Process according to claim 9, characterized in that the heat is transferred to the glass thermally joined with the carrier body over heat radiation and/or heat conduction and/or convection.
11. Process according to claim 9 or 10, characterized in that as carrier body ceramic plates are used.
12. Process according to one of claims 9 to 11, characterized in that the carrier bodies comprise SiC, especially SiSiC.

13. Process according to one of claims 9 to 12, characterized in that the emissivity of the carrier body is higher than 0.5.

14. Process according to one of claims 9 to 13, characterized in that the heat conductivity of the carrier body in the range of the heat treatment temperature is at least five times as high as that of the glass or of the glass-ceramic material to be treated.

15. Device for the homogeneous heating of semi-transparent and/or transparent glass and/or glass-ceramic material, especially in the range from 20°C to 3000°, especially in the range from 20°C to 1705°C with

15.1 infrared radiation sources (1) for the emission of shortwave infrared radiation;

15.2 means for the generation of infrared radiation acting indirectly on the glass and/or glass-ceramic material. characterized in that

15.3 the means for the generation of infrared radiation acting indirectly on the glass articles and/or glass-ceramic material are arranged and designed in such manner that the component of the radiation acting indirectly on the glass or the glass-ceramic material amounts to more than 50% of the total radiation output.

16. Device according to claim 15, characterized in that the means for the generation of infrared radiation acting indirectly on the glass articles and/or glass-ceramic material (5) comprise reflectors (3) or diffusors for the reflection or scattering of infrared radiation.

17. Device according to one of claims 15 to 16, characterized in that the device comprises a space encircled with walls, base and cover, in particular an IR radiation hollow space.

18. Device according to claim 17, characterized in that the surface of the walls and/or of the base and/or of the

cover of the encircled space comprises the reflectors or diffusors.

19. Device according to claim 18, characterized in that the reflectors or diffusors are designed in such manner that more than 50% of the radiation impinging on these surfaces is reflected or scattered.

20. Device according to claim 19, characterized in that the reflectors or diffusors are designed in such manner that more than 90%, or 95%, respectively, especially more than 98% of the radiation impinging on these surfaces is reflected or scattered.

21. Device according to one of claims 16 to 20, characterized in that the reflectors (3) or diffusors (3) comprise one of, or mixtures of, several of the following materials:
Al_2O_3; BaF_2; $BaTiO_3$; CaF_2; $CaTiO_3$;
MgO; 3.5 Al_2O_3; MgO, SrF_2; SiO_2;
$SrTiO_3$; TiO_2; quarzal; spinell,
Cordierite; cordierite sinter glass-ceramic

22. Device according to one of claims 15 to 21, characterized in that the means for the generation of radiation acting indirectly on the glass and/or the glass-ceramic material comprise a carrier body that stands in thermal contact with the glass articles or glass-ceramic material and absorbs a component of the indirect infrared radiation.

23. Device according to claim 22, characterized in that the carrier body comprises ceramic plates.

24. Device according to claim 22 or 23, characterized in that the carrier body comprises SiC, especially SiSiC.

25. Device according to one of claims 22 to 24, characterized in that the emissivity of the carrier body is greater than 0.5.

26. Device according to one of claims 22 to 25, characterized in that the heat conductivity of the carrier body in the range of the heat treatment temperature is at least five

times as high as that of the glass or of the glass-ceramic material to be treated.

27. Usage of a device according to one of claims 15 to 26 for the rapid, temperature-homogeneous heating-up of glass-ceramic blanks in the ceramization.

28. Usage of a device according to one of claims 15 to 26 for the rapid reheating of glass blanks for a subsequent hot shaping.

29. Usage of a device according to one of claims 15 to 26 for the countersinking (Absenken) of glass articles and/or glass-ceramic material.

30. Usage of a device according to one of claims 15 to 26 as a fiber-drawing furnace (Faserziehofen) for the homogeneous heating of fiber bundles to drawing temperature.

31. Usage of a device according to one of claims 15 to 26 for the supporting and exclusive heating in the mixture meltdown (Gemengeeinschmelzung).

32. Usage of a device according to one of claims 15 to 26 for the purifying melting of glass articles and/or glass-ceramic material.

33. Usage of a device according to one of claims 15 to 26 for the supportive or exclusive heating in the shaping, especially in the drawing, in the rolling, in the casting, in the throwing, in the pressing, in the blowing in the blow-blow process, in the blowing in the press-blow process, in the blowing in the ribbon process (Ribbon-Verfahren), for flat glass production as well as in the floating.

34. Usage of a device according to one of claims 15 to 26, for the supportive or exclusive heating in the cooling, in the melting, in the thermal solidification, in the stabilizing or fine cooling for the setting-in of a desired fictitious temperatures, of a desired index of

refraction, of a desired compaction with subsequent temperature treatment, in the aging of thermometer glasses, in the demixing (Entmischen), in the dyeing of tarnished glass, in the controlled crystallizing, in the diffusion treatment, in particular chemical solidifying, in the reshaping, in particular countersinking, bending, drawing, blowing, in the separating, especially melting-off, breaking, setting (Schränken), bursting, in the cutting, in the joining as well as in the coating.